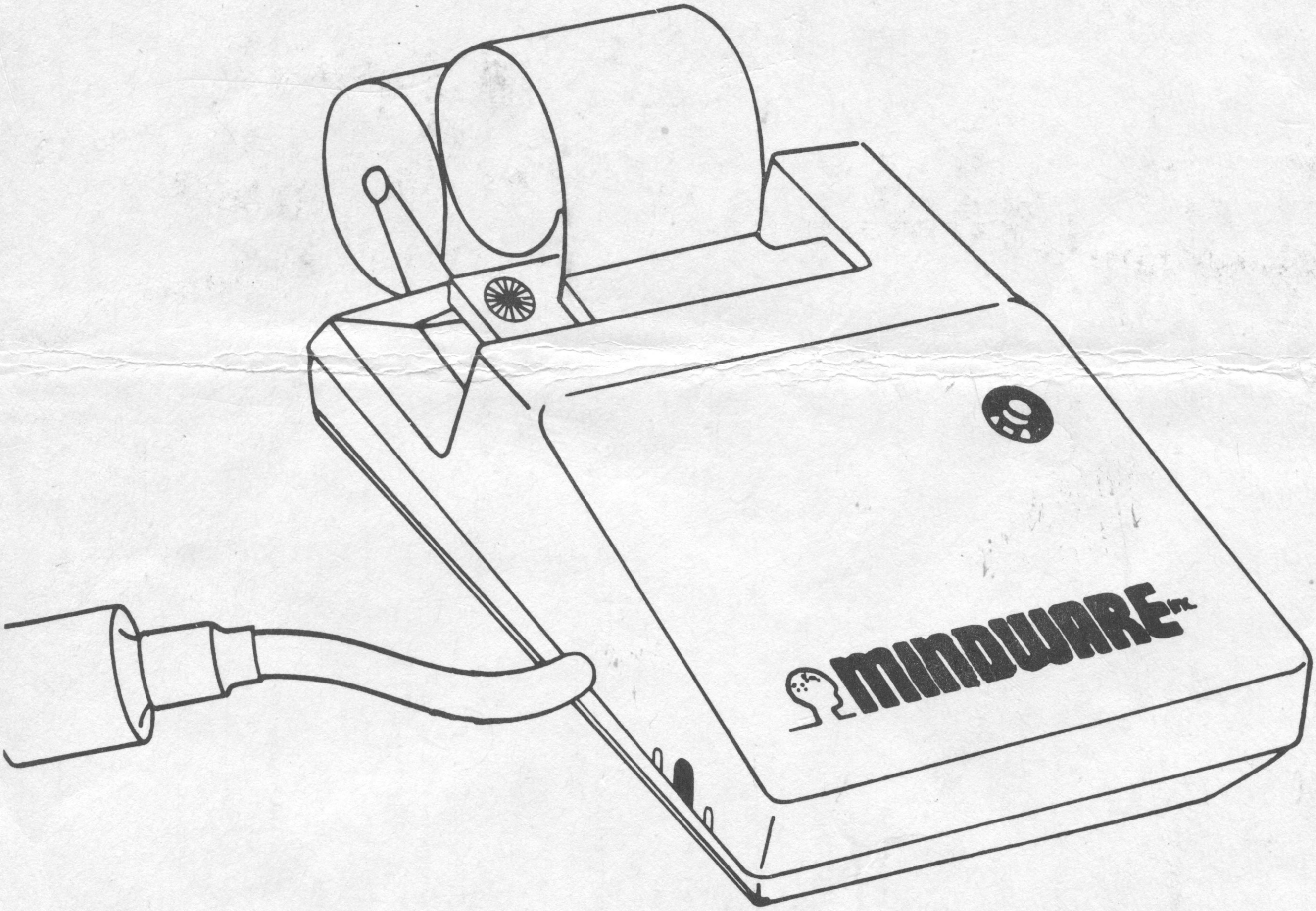
MINDWARE INC.

15 TECH CIRCLE, NATICK, MASS. 01760

The Only
U.S. Printer
For The
TS-100 and
ZX-81 Computers


MINDWARE INC.

MW-100

PLAIN PAPER PRINTER

MINDWARE INC.
PRODUCTS THAT SUPPLEMENT NATURE'S COMPUTER

15 TECH CIRCLE
NATICK, MA 01760
U.S.A.
(617) 655-3388

MINDWARE MW-100 PRINTER MANUAL

A. Hooking up your printer.

B. Printing from your computer.

C. Replacing paper.

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E. Using your MW-100 with other peripherals.

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IMPORTANT INFORMATION ON POWER SUPPLIES FOR THE MW-100 PRINTER

READ BEFORE USING YOUR MW-100 PRINTER

There are two (2) power supplies that will work with the MW-100 printer. They are:

1. The Sino-American power supply unit provided with the MW-100. This unit plugs into the side of the MW-100. It powers both the computer and printer.

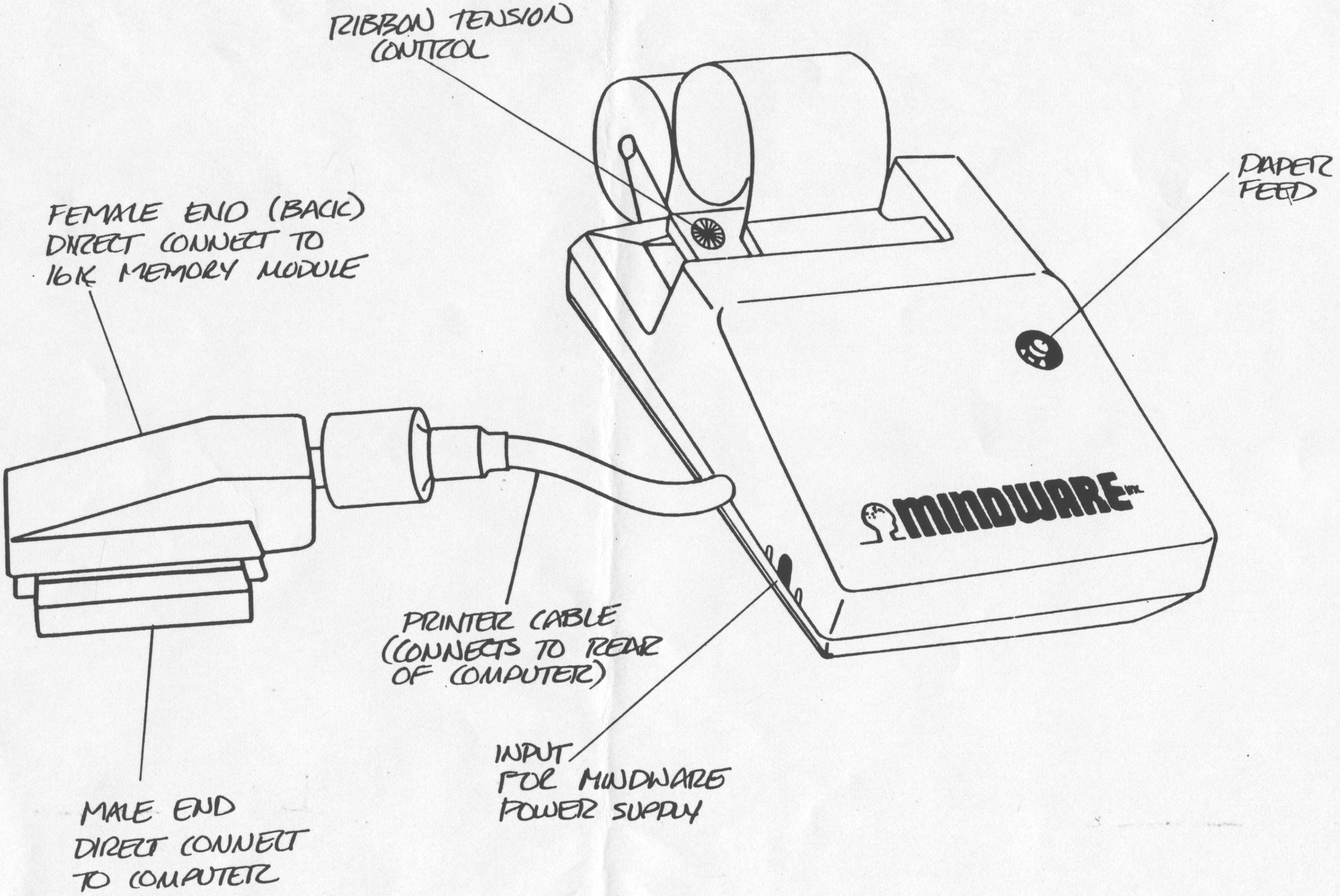
2. The power supply provided with some of the early versions of the Timex TS-1000 (reads as follows) will also power the MW-100 and TS-1000. It is marked:
   Sino-American
   Model: 9-10
   Output: 9V DC 1.0A

The following power supply units will not power the MW-100 and TS-1000 (Sinclair ZX81):

1. The Sinclair power supply (if you ordered a unit from Sinclair).

2. The Timex TS-1000 power supply that reads as follows:

   DVE
   650 mA
   Output 9.75 volts


RIBBON TENSION CONTROL
PAPER FEED
FEMALE END (BACK) DIRECT CONNECT TO 16K MEMORY MODULE
MINDWARE INC
PRINTER CABLE (CONNECTS TO REAR OF COMPUTER)
INPUT FOR MINDWARE POWER SUPPLY
MALE END DIRECT CONNECT TO COMPUTER

Thank you for purchasing the Mindware MW-100 Plain Paper Printer. It is compatible with the Sinclair ZX-81 and Timex TS-1000 computer. It will function with or without a 16K RAM Module (refer to section E for details on other peripheral connections).

YOUR MW-100 PRINTER PACKAGE

With your MW-100 printer, you will find:

a power supply - 1.0 Amp

a connecting cable - Permanently attached to the printer

one roll of printer paper

one printer ribbon

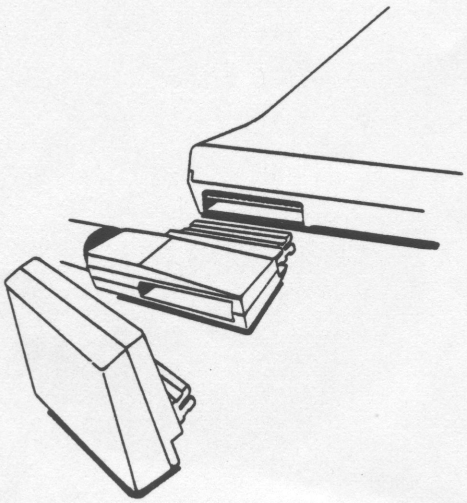
a warranty card - Please fill out and return to Mindware

and this users' manual. Read this manual before attaching your printer to your computer.

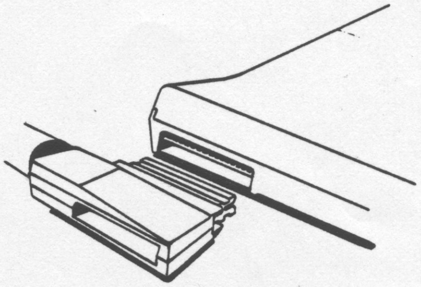
A. HOOKING UP YOUR MW-100 PRINTER

To assure proper operation of your printer and computer, unplug your computer's power jack before attaching your MW-100. Then connect the printer as shown below:

WITH 16K RAM MODULE



WITHOUT 16K RAM MODULE



1. Plug the connector on the printer into the connector on the rear of your computer. Again, please note the 16K RAM Module will direct connect to the MW-100 male input.
2. Then connect the printer to the Mindware power supply. Please remember that the Mindware power supply plugs into the side of the MW-100, and not into the Timex TS-1000. Also note that the 1.0 amp Sino-American power supply issued with some of the initial TS-1000 shipments will power both the TS-1000 and the MW-100 simultaneously. In the event you wish to use the original 1.0 amp Timex supplied power supply, it will plug only into the side of the TS-1000, and not the MW-100.
3. Finally, plug the power supply into an outlet.

You are now ready to use your printer. To make sure you have power to both the computer and printer, push the red paper feed button. The printer should now have power and be advancing the paper.

B. PRINTING WITH YOUR MW100

Your MW-100 prints in three modes. Each prints a 16-character line. You select the mode from your computer with one POKE command. Each mode has a different POKE command. You will note the POKE command just above the letter O on your ZX-81 or Timex Sinclair 1000. The POKE command for each mode is explained in the discussion of that mode below. In the examples, each POKE is entered with no line number. You can also choose or change a mode in a program by putting a line number in front of the appropriate POKE command and including it in a program.

You can print while your computer is in either the FAST or the SLOW mode. To stop the printer before it is finished, press the BREAK key.

While the MW-100 is printing, the TV display will flash black lines and blank screens.

To remove your printed tape from the printer, press the red paper feed button on the top of the MW100 to advance the paper. Then tear it off.

Mode 0

Mode 0 prints each 32-character line as two 16-character lines. Thus, if you have 24 lines of program, you will get 48 lines of program on your hardcopy (paper tape). This mode is useful for printing program listings.

To select Mode 0, type this line on your computer:

```
POKE 16417,0
```

Then press ENTER. You will see 0/0 at the bottom left of your TV screen. Now load or type in a program. Try this sample program:

```
10 FOR X=1 TO 10                    (Press ENTER)
20 PRINT "THIS IS A SAMPLE OF
MODE 0 ON THE MW-100 PRINTER"       (Press ENTER)
30 NEXT X                           (Press ENTER)
```

To print this listing, press LLIST (hold the SHIFT key and press the G key), then ENTER. Your MW100 will print a tape that looks like this:

```
  10 FOR X=1 TO
10
  20 PRINT "THIS
 IS A SAMPLE OF
MODE 0 ON THE MW
-100 PRINTER"
  30 NEXT X
```

To advance the paper, push the red paper feed button. Now (if you wish), tear off the section just printer by quickly pulling the paper toward the front of the grooved edges on the printer.

Mode 1

Mode 1 prints the computer's 32-column display in two 16-column halves. First it prints the left half, then the right half. This mode is useful for printing screen displays.

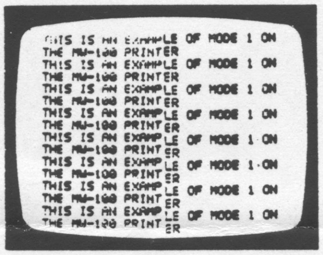
To select Mode 1, type in this line:

```
POKE 16417,1
```

Then press ENTER. Again, you will see a 0/0 at the bottom left of your screen. Now type or load a program. Let's try our sample program again:

```
10 FOR X=1 TO 10                          (Press ENTER)
20 PRINT "THIS IS AN EXAMPLE OF
MODE 1 ON THE MW-100 PRINTER"             (Press ENTER)
30 NEXT X                                 (Press ENTER)
```

This time press RUN, then ENTER. The screen will look like this:



```
THIS IS AN EXAMPLE OF MODE 1 ON
THE MW-100 PRINTER
THIS IS AN EXAMPLE OF MODE 1 ON
THE MW-100 PRINTER
THIS IS AN EXAMPLE OF MODE 1 ON
THE MW-100 PRINTER
THIS IS AN EXAMPLE OF MODE 1 ON
THE MW-100 PRINTER
THIS IS AN EXAMPLE OF MODE 1 ON
THE MW-100 PRINTER
THIS IS AN EXAMPLE OF MODE 1 ON
THE MW-100 PRINTER
THIS IS AN EXAMPLE OF MODE 1 ON
THE MW-100 PRINTER
```

To print this display, press COPY (press the Z key when you have a K cursor or run report at the bottom left of the screen), then ENTER. Your MW100 will print the left half of the screen, then the right half:

```
THIS IS AN EXAMP          LE OF MODE 1 ON
THE MW-100 PRINT          ER
THIS IS AN EXAMP          LE OF MODE 1 ON
THE MW-100 PRINT          ER
THIS IS AN EXAMP          LE OF MODE 1 ON
THE MW-100 PRINT          ER
THIS IS AN EXAMP          LE OF MODE 1 ON
THE MW-100 PRINT          ER
THIS IS AN EXAMP          LE OF MODE 1 ON
THE MW-100 PRINT          ER
```

Tape the two halves together to get an exact copy of the screen display.

Mode 2

Mode 2 is not currently implemented on the MW-100.

Mode 3

Mode 3 prints continuous 16-character lines, each of which displays columns 1 through 16 of the TV screen. Columns 17 through 32 are not printed. Mode 3 is most useful when you have 16-character lines on the screen, as with a mailing list.

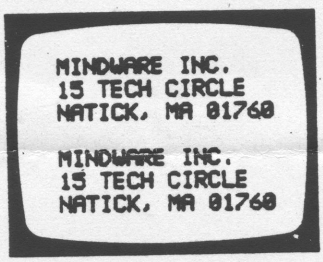
To select Mode 3, type this line on your computer:

```
POKE 16417,3
```

Then press ENTER. Then type or load a program. Try this sample program:

```
10 FOR X=1 TO 5                (Press ENTER)
20 PRINT "MINDWARE INC."       (Press ENTER)
30 PRINT "15 TECH CIRCLE"      (Press ENTER)
40 PRINT "NATICK, MA 01760"    (Press ENTER)
50 PRINT                       (Press ENTER)
60 NEXT X                      (Press ENTER)
```

Press RUN then ENTER. The screen will look like this:



```
MINDWARE INC.
15 TECH CIRCLE
NATICK, MA 01760

MINDWARE INC.
15 TECH CIRCLE
NATICK, MA 01760
```

To print this listing, press COPY (press the Z key when you have a K cursor or a run report at the bottom left of the screen) then ENTER. Your printout looks like this:

```
MINDWARE INC.
15 TECH CIRCLE
NATICK,MA 01760

MINDWARE INC.
15 TECH CIRCLE
NATICK,MA 01760

MINDWARE INC.
15 TECH CIRCLE
NATICK,MA 01760

MINDWARE INC.
15 TECH CIRCLE
NATICK,MA 01760

MINDWARE INC.
15 TECH CIRCLE
NATICK,MA 01760
```

SUMMARY OF PRINTER COMMANDS

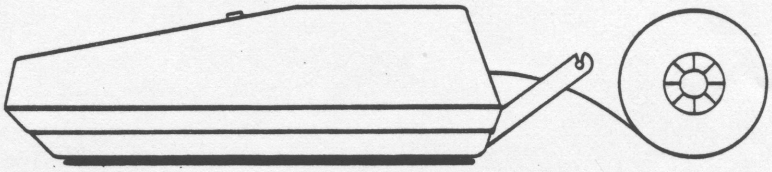
Mode	POKE	Format	Command	Use
0	16417,0	16-column alternating	LLIST	Program listings
1	16417,1	split-screen	COPY	Screen image
2	currently not used			
3	16417,3	16-column truncated	COPY	16-column information
ALL MODES		All modes	BREAK	Stop print

C. REPLACING PAPER

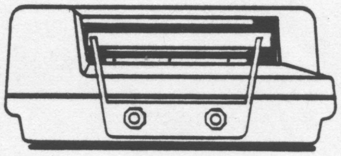
Your MW-100 printer uses 1 3/4" plain-paper tape readily available from office supply stores.

To replace the paper, follow these steps:

1. Slip the metal spool through the center of the new roll of paper.
2. Make sure the leading edge of the new paper roll is cut at a straight angle. This will enable you to feed the paper into the printer at a straight angle (eliminating paper jamming).
3. Rest the new paper roll on a flat surface approximately 5" behind the printer. At this point you will be feeding the paper between the silver paper holding bars as illustrated below:



4. Guide the straight edge of the paper directly into the narrow silver feeding slot which rests just below the back of the ribbon. Note the drawing below:



5. As you feed the paper into the rear paper feed slot, push the red paper-feed button. Insert the paper firmly enough so that as you push the red paper advance button, the printer catches the paper and begins to feed it entirely through (and up out of) the printer. Place paper roll (with metal spool) back into the slots on the paper holding bars.

6. OPTIONAL METHOD: Remove ribbon cartridge, then feed paper in by turning platen manually. Replace ribbon cartridge over the end of the paper, and use red button to take up slack.

D. REPLACING THE RIBBON

Your MW-100 uses Radio Shack Pocket Computer printer ribbon cartridges (catalog number 26-3507).

To replace the printer ribbon, first remove the old ribbon cartridge:

1. Press down on the right side of the ribbon cartridge (to the right of the paper cutting edge as you face the printer).
2. The left side of the cartridge will pop up. Lift the cartridge out by the left edge.

To insert a new ribbon cartridge, follow these steps:

1. Place the new cartridge in place, making sure the ribbon is in front of the silver paper guide (or in front of the paper if paper is already inserted).
2. Press down on either side of the cartridge to pop it in place. Rotate the dial on the left side counterclockwise to tighten the ribbon.
3. Make sure the ribbon is completely recessed and out of view. If the ribbon crimps and/or binds, continue rotating the ribbon dial until the ribbon falls properly into place.

E. USING YOUR MW-100 PRINTER WITH OTHER PERIPHERIALS

You can use other Sinclair ZX-81 and Timex Sinclair 1000 peripherals with your MW-100. The connector that plugs into the computer has another connector on its rear that duplicates the computer's connector. The power supply that comes with your MW-100 provides enough power for the computer, the printer, and most other peripherials.

NOTE: Before connecting another peripheral to your computer and MW-100, disconnect the power jack from the printer to avoid damage to any unit.

F. IF SOMETHING GOES WRONG...

If:	Try:
Nothing happens when you press the keys on your computer	Check that the connectors are firmly plugged into each other and that the power supply is plugged into a live outlet.
The paper jams inside the printer	Wind the paper back into the roll. Reinsert it, following the directions for replacing paper.

If these solutions do not work, do not open the printer case. All internal problems must be fixed by a qualified repairperson. See the next section for directions on how to return your printer for service.

G. RETURNING YOUR PRINTER FOR SERVICE

If you have followed the directions in this manual and your printer does not work correctly, return it to Mindware for service. Do not open the case and attempt to service it yourself -- you will void your warranty (if still in force) and possibly damage your printer.

Repack your MW-100 carefully, preferably in the original box and packing material. Send it by mail or UPS to Mindware at the address provided in the Warranty enclosed with your MW-100. Include a letter detailing the problem and giving your name, address, telephone number and date of purchase.

Mindware's service representatives will repair your unit and return it to you promptly by UPS. If your unit is not covered by a Warranty, you will be charged for service at Mindware's rates in effect on the date we receive your printer. See the Warranty for other important information.

H. POTENTIAL INTERFERENCE WITH RADIO OR TV RECEPTION

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- reorient the receiving antenna
-- relocate the computer with respect to the receiver
-- move the computer away from the receiver
-- plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

NOTE: The cylindrical object on the printer's cord is a radio interference absorption device.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the US Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

I. PRINTER SPECIFICATIONS

Printing method: Impact dot matrix printer
Print format: 5x7 dot matrix; maximum 16 columns
Print speed: Approximately one 5x7 dot matrix line per second
Paper: 1 3/4 inch
Inking: Ribbon cassette, fed automatically during motor revolutions
Dimensions: 4 1/2"(w) x 6"(d) x 2"(h)
Weight: 16 oz
Power supply output: 9 volt DC, 1.0 Amp